(sump T-100), the water is pumped to the final two ion exchange columns (IX Column Nos.3 and 4) in series. IX Column No. 3 contains a strong acid cation resin (IONAC C-267) that removes remaining positively charged cations including excess hardness and metals. IX Column No. 4, with weak base anion resin (IONAC AFP-329), is the last unit and removes excess negatively charged anions. The treated water then exits the building and flows to one of the Effluent Storage Tanks (T-205, T-206, T-207).

3.0 SAMPLING APPROACH AND REQUIREMENTS

This section addresses sample locations, frequency, specific analytical needs, sampling requirements, and associated quality assurance/quality control (QA/QC) requirements. Data collection follows requirements outlined in the Rocky Mountain Remediation Services, L.L.C. Quality Assurance Program Description (QAPD), RMRS-QAPD-001, Rev. 1, 1/01/97. Refer to Section 5.0 of this document for a discussion on the Data Quality Objectives (DQO's) for the CWTF samples.

3.1 SAMPLING LOCATIONS AND FREQUENCY

Provisions are made for sample collection at specific points in the collection and treatment system to evaluate influent and effluent characteristics, unit process effectiveness, and waste stream characteristics. The placement of sampling locations allows each treatment unit to be isolated if evaluation of individual unit efficiency is required. Samples collected from 891COLGAL and 891COLWEL will follow the sampling protocol outlined in the OU1 ROD.

9/25/97

The following is a list of sampling locations and associated Rocky Flats Environmental Data System (RFEDS) location codes:

- Routinely Sampled Sources (samples are taken quarterly)
  - Collection Gallery(French Drain Sump) 891COLGAL
  - Collection Well 891COLWEL
  - OU2 Weir 059 SW059
  - OU2 Weir 061 SW061
  - OU2 Weir 132 SW132
  - Building 881 Footing Drain SW13494 (formerly 891FDRAIN)

- Process Samples (samples are taken at the discretion of the Responsible Manager)
  - Precipitation System Influent — RS2
  - Microfiltration System Effluent — RS5
  - Clay Absorbent Effluent — 891CAEFF
  - UV/Hydrogen Peroxide Influent — 891UVINF
  - UV/Hydrogen Peroxide Effluent — 891UVEFF
  - GAC Unit Effluent — 891GACEFF
  - Surge Tank T-203 Offgas — 891IONEXC
  - IX Column #1 Influent — 891IX1INF
  - IX Column #1 Effluent — 891IX1EFF
  - IX Column #2 Effluent — 891IX2EFF
  - Degasifier Offgas — 891DEGAS
  - Degasifier Sump — 891DEGASEFF
  - IX Column #3 Effluent — 891IX3EFF
  - IX Column #4 Effluent — 891IX4EFF
  - Spent Cleaning Tank Solution: TK-9 — RS10
  - Spent Flush Tank Solution: TK-10 — RS11
  - Effluent Tank Recirculation — 891MISCEFF

- Effluent Samples (sampled and compared to CWTF Action Levels in Appendix A prior to tank discharge)
  - T-205 Effluent — 891T-205
  - T-206 Effluent — 891T-206
  - T-207 Effluent — 891T-207
  - SID Discharge — 891SID

- Characterization Samples (sampled prior to use as needed)
  - Virgin Clay Absorbent — 891VCA
  - Virgin GAC (Liquid-Phase) — 891VGACL
  - Virgin GAC (Vapor-Phase) — 891VGACV
  - Virgin IX Column #1 Resin — 891VESIX1
  - Virgin IX Column #2 Resin — 891VESIX2
  - Virgin IX Column #3 Resin — 891VEXIX3
  - Virgin IX Column #4 Resin — 891VESIX4

- Waste Stream Samples (sampled and evaluated prior to disposition)
  - IX Regenerant Neutralization T-210 — 891REGTANK
  - Spent Clay Absorbent — 891SCA
  - Spent GAC (Liquid-Phase) — RS9
  - Spent GAC (Vapor-Phase) — 891SGACV
  - Filter Press Cake — RS8
  - IX Column #1 Resin — 891VESIX1
  - IX Column #2 Resin — 891VESIX2
  - IX Column #3 Resin — 891VESIX3
  - IX Column #4 Resin — 891VESIX4

TABLE 3-1
Sampling Summary - Influent Waters

RFEDS Location Code	Sample Location	Sample Type	Sampling Frequency[1]	Analytical Suites	Analytical Methods/Protocol Used
891COLWEL[10]	Collection Well	Aqueous	One grab sample per quarter	VOCs; Total Metals; Total Radionuclides[8]	VOCs EPA CLP Low Level or 8260 as appropriate; Metals TCL[2]; and Radiochemistry
891COLGAL[10]	Collection Gallery - French Drain Sump	Aqueous	One grab sample per quarter	VOCs; Total Metals; Total Radionuclides[8]	VOCs EPA CLP Low Level or 8260 as appropriate; Metals TCL[2]; and Radiochemistry
SW13494 (formerly 891FDRAIN)	881 Footing Drain	Aqueous	One grab sample per quarter	VOCs; Total Metals; Total Radionuclides[8]	VOCs EPA 8260, or CLP Low Level as appropriate; Metals TCL[2]; and Radiochemistry
SW059	Weir 59	Aqueous	One grab sample per quarter	VOCs; Total Metals; Total Radionuclides[3]	VOCs EPA Method 8260, or CLP Low Level as appropriate; Metals TCL[2]; Radiochemistry
SW061	Weir 61	Aqueous	One grab sample per quarter	VOCs; Total Metals; Total Radionuclides[3]	VOCs EPA Method 8260, or CLP Low Level as appropriate; Metals TCL[2]; Radiochemistry
SW132	Weir 132	Aqueous	One grab sample per quarter	VOCs; Total Metals; Total Radionuclides[3]	VOCs EPA Method 8260, or CLP Low Level as appropriate; Metals TCL[2]; Radiochemistry
Not applicable	MDF	NA	No samples required.	Not applicable Several years of historic sample results indicate that the CWTF can accept and treat this decontamination water.	Not applicable
Not applicable	PADF	NA	No samples required.	Not applicable Several years of historic sample results indicate that the CWTF can accept and treat this decontamination water.	Not applicable
Not applicable	Purge water	NA	No samples required.	Not applicable Several years of historic sample results indicate that the CWTF can accept and treat this water.	Not applicable
Project Specific	ER Accelerated Action Project Water	Aqueous	Adequate to characterize the influent	Analytical suites are at the discretion of the Responsible Manager based on the influent source and treatment plant unit process data needs. In general, this sampling will include VOCs, SVOCs, PCBs, Metals, Radionuclides, TOC, Cyanide, Sulfide, pH, NO_2 /NO_3, and Water Quality[7].	

1. Sampling frequency and analytical parameters may be increased at any time at the request of the Responsible Manager.
2. Target Compound List (TCL) by CLP or SW-846 Methods.
3. Radionuclides may include gross alpha and beta activities, Pu 239/240, Am 241, U 233/234, U 235, and U238.
4. Radionuclides include gross alpha and beta activities, Pu 239/240, Am 241, Sr 90, Tritium, and total Uranium.
5. Sampling parameters must certify compliance with LDR requirements.
6. Analyte list for LDR compliance based on TCLP Metals, SVOCs and VOCs.
7. Water Quality includes TSS, TDS, F, SO_4, Cl, CO_3 and HCO_3.
8. Radionuclides include gross alpha and beta activities, U 233/234, U 235 and U 238.
9. Cyanide, Sulfide, SVOCs, and PCBs will be analyzed as required by influent characterization.
10. Sampling will be conducted as specified in the OU1 ROD.

TABLE 3-2

Sampling Summary - Effluent Water

RFEDS Location Code	Sample Location	Sample Type	Sampling Frequency[1]	Analytical Suites[9]	Analytical Methods/Protocol Used
891T-205 891T-206 891T-207	Effluent Tank Discharge T-205, V-96 T-206, V-96 T-207, V-96	Aqueous	One grab sample per tank before discharge	VOCs, Total Metals, Total Radionuclides[4], pH, NO_2/NO_3	VOCs EPA 8260, Metals TCL[2], Radiochemistry, pH, and NO_2/NO_3

5.1 DATA QUALITY OBJECTIVES

Routine Influent Sources

The OU1 groundwater sources (e.g., French Drain Sump and Collection Well) are already well characterized, and therefore, the purpose of the quarterly sampling at these locations is to track the contamination trends from these sources.

Historically the sampling at the OU1 groundwater locations (e.g., French Drain Sump and Collection Well) and the OU2 surface water locations (e.g., SW-59, SW-61, and SW-132) was defined in the respective OU1 and OU2 IM/IRAs. Samples collected from the 891COLGAL and 891COLWEL will follow the procedure outline in the OU1 ROD. The OU1 and OU2 locations are already well characterized and in an effort to standardize sampling activities, the sampling at these locations will be streamlined as follows:

JLC 9/25/97

- VOAs
- Total Metals
- Total Radionuclides.

For each major analytical group the standard list of analytes at the standard detection limits will be analyzed (note that the RFCA list includes some rather exotic compounds and at times specifies detection limits which cannot be achieved).

No sampling of routine groundwater purge water, or water from the MDF and PADF will be done prior to acceptance and treatment of this water at the CWTF because historic information indicates that this water has little contaminant variation. However the Responsible Manager may choose to increase sampling for any of these influent waters based on circumstances/process knowledge.

Non-Routine Influents (such as waters from ER Accelerated Action Projects)

The Responsible Manager will determine the sampling needs for non-routine influents based on process knowledge and engineering experience. In general, this sampling will include VOCs, SVOCs, PCBs, Metals, Radionculides, TOC, cyanide, sulfide, pH, NO_2 /NO_3 , and water quality. Sampling influent waters will determine treatment options and discharge sampling requirements.

Process Samples

All process sampling is at the discretion of the Responsible Project Manager to determine process efficiencies.

Effluent Tank Sampling

Although historically the Building 891 Effluent Tanks have been sampled only for efficiencies, Dissolved Metals, Volatile Organics, Total Radionculides, pH, NO_2/NO_3 and water quality parameters, the recent acceptance and treatment of waters from ER Accelerated Action projects coupled with the signing of RFCA has necessitated revising the sampling strategy for the Effluent Tanks. The treated effluent is sampled and analytical test results are compared to the CWTF Action Levels in Appendix A to determine if the effluent is acceptable for discharge to the South Interceptor Ditch according to 4-I50-ENV-OPS-FO.32, Rev. 1, Treated Effluent Discharge, CWTF.

For each major analytical group the standard list of analytes at the standard detection limits will be analyzed (note that the RFCA list includes some rather exotic compounds and at times specifies detection limits which cannot be achieved). At a minimum the Effluent Tanks will be sampled as follows:

- VOCs;
- Total Metals;

CWTF Chemical Specific ARAR/Effluent Wastewater Treatment Standards
Deviations to Surface Water Action Levels

ANALYTE	COMMENT
Metals	Using total instead of dissolved, total, and total recoverable. Cost saving measure and may be more stringent than the dissolved metals. Metals listed as dissolved and total recoverable will be analyzed as total.
Aluminum, Cadmium, Copper, Silver, Antimony, Beryllium	using PQL
Boron	No CRDL established, not under contract for analysis. Not expected to be present in influent.
Pesticides/Herbicides	Not expected to be present in influent
Aroclors	Analyzed only if detected in the influent. PQL of 2.0 ug/L will be used for action level for Ar-1221.
3,3'-Dichlorobenzidine, Hexachlorocyclopentadiene	using PQL
Di(2-ethylhexyl)adipate, n-Nitrosodibutylamine, n-Nitrosodiethylamine, n-Nitrosodimethylamine, n-Nitrosopyrrolidine, Pentachlorobenzene, 1,2,4,5-Tetrachlorobenzene	Not on Target Compound List
1,2-Diphenylhydrazine	Degrades in analytical instrument injection port. Not on Target Compound List.
Acrylonitrile, Acrolein	Analyze only if detected in the influent. Using PQL.
bis(Chloromethyl)ether	Not listed in methods of analysis. Not under contract for analysis.
Dibromochloropropane 1,2-Dibromoethane	Analyze only if detected in the influent. Using PQL.
Cyanide	using PQL
Nitrate and Nitrite	Due to holding times, will use Nitrate + Nitrite with an action level of 100 mg/L.
Sulfide	Analyzed only if detected in the influent. Will use PQL of 1.0 mg/L.
Chromium, VI	Due to holding time requirements, total chromium will be analyzed. No historical influents containing hexavalent chromium.
Radium 226 and 228	No historical data for these.

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

Document Number: RF/ER-96-0018

Section: (Section #, Rev. #) _____

Page 1 of _____

Effective Date: _____

Organization: _____

Consolidated Water Treatment Facility

Sampling and Analysis Plan

_____	_____
Operations Manager	Date
_____	_____
Project Manager	Date
_____	_____
Quality Assurance Manager	Date